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nerve corresponding to the *pneumo-gastric*, or *par vagum*, and shows that it is distributed chiefly to the organs of digestion and the respiratory passages. He next describes the anterior lateral cephalic ganglia, which, from their position, might be regarded as auxiliary brains. The situation and course of another nervous tract, which from its extensive connexions and peculiar mode of distribution is considered as corresponding to the sympathetic system, are also traced. The author notices a set of nerves which, adopting the views of Sir Charles Bell, he considers as analogous to those which the latter has denominated the respiratory nerves of vertebrated animals ; and among a great number of interesting observations, of which it is impossible to give any abridged account, one of the most remarkable is the discovery that the primary longitudinal nervous cords of insects consist of two tracts, the one situated over the other, corresponding to the two columns of which the spinal cord consists in vertebrated animals ; the one appropriated to sensation, and the other to voluntary motion ; the nerves from each of these tracts being variously combined, according to the purposes they are designed to fulfil. This important distinction, which was first traced in the nervous cords of the Lobster, was afterwards distinctly observed by him in the *Scorpion* and the *Scolopendra*, and lastly, in several species of insects, as the *Gryllus viridissimus*, the *Carabus*, the *Papilio urticae*, and the *Sphinx ligustri*. Numerous drawings of the parts described accompany the paper.

3. "Observations on the Torpedo, with an account of some additional experiments on its Electricity." By John Davy, M.D., F.R.S., Assistant Inspector of Army Hospitals.

The first part of this paper is occupied by an investigation of the circumstances attending the foetal development of the Torpedo. In the first stage of embryonic growth which the author had an opportunity of observing, when the embryo was about seven tenths of an inch in length, it had neither fins nor electrical organs, nor any appearance of eyes ; it exhibited short external branchial filaments, not yet carrying red blood ; and there was a red spot in the situation of the heart, communicating by red vessels in the umbilical cord with the vascular part of the egg. There is no membrane investing the foetus, as is the case with some species of *Squali* ; nor any fluid in the uterine cavity ; neither could the author find any urea or lithic acid in that cavity. By taking the mean of many observations, it appeared that the weight of the egg, before any appearance of the embryo, is 182 grs., and after its appearance, including the weight of the latter, 177 grs. ; while the weight of the mature fish is about 479 grs. ; showing an augmentation of more than double. Thus it differs remarkably, in this respect, from the foetal chick, which at its full time weighs considerably less than the original yolk and white from which it is formed. No communication can be traced between the foetus of the Torpedo and the parent, through the medium of any vascular or cellular structure ; and the stomach of the former is always found empty. Hence the only apparent source of nourishment is absorption from the surface ;

and the author states his reasons for believing that the branchial filaments are the principal absorbing organs, the materials they receive being chiefly employed in the construction of the electrical organs, while those which enter into the composition of the body generally are absorbed by the general surface of the fœtus. The author is led, from his researches, to the conclusion that the mode of reproduction in the *Torpedo* is intermediate between the viviparous and the ovoviviparous.

In the second part of the paper, the author discusses the question as to the number of species of the genus *Torpedo* existing in the Mediterranean ; and concludes that there are only two, viz. the *Ochiatella* and the *Tremola*.

4. "Appendix to a former Paper on Human Osteology." By Walter Adam, M.D. Communicated by Dr. Prout, F.R.S.

This appendix contains linear representations of various dimensions of the bones of the human body, both male and female, with a view to facilitate the comparison of the human frame with that of other animals, and reduce it to definite laws. The author states that many of the rectilinear dimensions of human bones appear to be multiples of one unit, namely, the breadth of the cranium directly over the external passage of the ear ; a dimension which he has found to be the most invariable in the body. No division of that dimension was found by him to measure the other dimensions so accurately as that by seven, or its multiples. Of such seventh parts there appear to be twelve in the longitudinal extent of the back, and ninety-six in the height of the whole body.

5. "On the Repulsive Power of Heat." By the Rev. Baden Powell, M.A., F.R.S., Savilian Professor of Geometry in the University of Oxford.

The expansion of bodies by heat appearing to imply a mutual repulsion of their particles, it becomes a question whether such repulsive power may not be excited by it between particles or masses of matter, at sensible as well as insensible distances. After noticing the partial investigations of this question by Libri, Fresnel, Saigey, and Professor Forbes, the author describes the methods he has employed with a view to its solution, and which consisted in applying heat to two lenses of glass, pressed together so as to exhibit the colours of thin plates ; the variation of the tints furnishing exact indications of the most minute changes of distance between the surfaces, by whatever causes they may be produced. The conclusion he deduces from his experiments, conducted on this plan, is that the separation of the surfaces is of a different character, and is greater than can be accounted for by the mere change of figure produced by the heat ; and is therefore in part to be ascribed to a real repulsive action between the surfaces of the glasses derived from the power of heat. He also found, on trying similar experiments with glass in contact with a metallic surface, that the results were considerably influenced by the radiating power of the latter ; the effect being increased when this power was greater, and